

REMARKS

REGARDING THE CLAIMS AMENDMENTS

Claim 1 has been amended to specify that aluminum is added for the purposes of making up depleted aluminum during the crystallization. Bases for this amendment can be found at paragraph 34, 63, and other locations in the application.

Claim 7 has been amended to correct an antecedent basis error.

Claim 9 has been amended to overcome the Examiner's informality objection.

Claim 12 at step e) has been amended to specify that aluminum is added for the purposes of making up depleted aluminum during the crystallization. Bases for this amendment can be found at paragraph 34, 63, and other locations in the application.

Claim 13 has been amended to delete the use of the term "such as."

Claims 14, 17, 18, and 20 have been amended to overcome the Examiner's informality objections.

Claims 15 and 16 have been amended to correct an antecedent basis error.

Claim 21 has been cancelled.

REGARDING THE REJECTIONS AND OBJECTIONS

Claims 1-21 are pending in the application. The Examiner objects to claims 9, 14, 17, 18 and 20. Claims 1-21 are rejected. The Examiner's objections and rejections are addressed below in substantially the same order as in the office action.

OBJECTIONS

Claims 9, 14, 17, 18 and 20 have been amended as suggested by the Examiner. It is the Applicants' position that the Examiner's objections are now moot.

REJECTIONS UNDER 35 USC § 112

Claims 1-21 are rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21 is rejected under 35 USC 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. The Examiner states that this claim is an omnibus type claim.

Claims 4-5, 9-11, 14, 18-20 are rejected for failing to correct the deficiencies of the claims from which they depend.

The Examiner has objected claims under 35 USC § 112 as being indefinite because of the use of comparative language or otherwise relative terms such as "enhancing", "extended", "dilute", "depleted" and "enriched" in the claims. It is the Applicants position that these terms do not render the claims indefinite.

In Claims 1 and 12, the Examiner states that the use of the term "enhancing the yield of molecular sieve zeolite" stating that it is unclear whether the use of this term means that the yield is enhanced vis-à-vis this process described in the application or all prior art processes. In the application, the term "enhance the yield" has been used to indicate that the process enhances the yield of the molecular sieve zeolite as compared to a process that does not employ an intermediate stage aluminum addition. Examples 3, 5, in

contrast to control example 2 clearly depict this yield enhancement. Examples 6 and 7 also clearly depict this yield enhancement of the of the molecular sieve zeolite as compared to the process that does not employ intermediate stage aluminum addition. In view of the above, the Applicants respectfully assert that the claims including or depending from claims including the terms "enhanced" or "enhancing" are in condition for allowance under 35 USC §112.

In Claim 2, the Examiner states that the use of the term "extended period" renders the claim indefinite. As regards the use of the term "extended period", the Examiner indicates that the specification does not provide a standard for ascertaining the meaning or the length of such a period. The Applicants respectfully assert that the process of the present invention may be applied to yield a wide variety of molecular sieve zeolites as is shown clearly in the Examples. As can be seen from the examples, depending upon the natures of zeolite being prepared, the source of aluminum is added over an extended period and such exemplary extended periods is specific to the process of each example. It would be clear to one of ordinary skill in the art to determine the exact values for the "extended period" for a particular type of zeolite without further guidance. Any attempt by the Applicants to define each and every possible extended period for all possible processes would result in an application too prolix. In view of the above, the Applicants respectfully assert that the claims including or depending from claims including the term "extended period" are in condition for allowance under 35 USC §112.

In Claim 3, the Examiner states that the use of the term "dilute" renders the claim indefinite. Just as with "extended period", the "dilution" of the source of aluminum added depends upon the natures of zeolite being prepared. Again, the Applicants have provided some exemplary dilutions are shown in the examples, but to attempt to provide exact limits upon the concentration for each and every possible application would render the application too prolix. . It would be clear to one of ordinary skill in the art to determine the exact values for "dilution" for a particular type of zeolite without further guidance. In view of the above, the Applicants respectfully assert that the claims including

or depending from claims including the term "dilute or dilution" are in condition for allowance under 35 USC §112.

In Claims 6 and 12, the Examiner states that the use of the terms "depleted" and "enriched" renders the Claims indefinite. The Applicants respectfully assert that the term "depleted" in respect to aluminum is used in claims 6 and 12 in comparison to the total amount of aluminum necessary for crystallization. Similarly, the term "enriched" in respect to soda and silica is used in claims 6 and 12 in comparison to the total amount of soda and silica necessary for crystallization. Both of these terms would be understood by one of ordinary skill in the art. The Applicants respectfully assert that these claims are also in condition for allowance under 35 USC §112.

The Examiner States that there is no antecedent basis for the term "intermediate time period" in Claim 7. The Applicants have amended Claim 7 and respectfully assert that his claim is now in condition for allowance under 35 USC §112.

The Examiner has rejected Claim 8 on the basis of the Applicants' use of the terms low, medium and high in regard to silica to alumina ratios. It is the Applicants' position that these are terms of art and are well known within the art. For example, there are more than 100 patents which use the term "low silica to alumina ratio." Specific cites from three of these are:

For example, a gross chemical analysis may include aluminum which is present in the form of cations associated with the acidic sites on the zeolite, thereby giving a low silica:alumina ratio. Similarly, if the ratio is determined by thermogravimetric analysis (TGA) of ammonia desorption, a low ammonia titration may be obtained if cationic aluminum prevents exchange of the ammonium ions onto the acidic sites. US Pat. No. 6602840

As mentioned above, cracking activity is favored by the more highly acidic zeolites and these are generally characterized by a relatively low silica:alumina ratio. Hence, acidic activity is related to the proportion of tetrahedral aluminum sites in the structure of the catalyst. US Pat. No. 6416654

We have found subjecting low silica-to-alumina ratio zeolites to moderate steam calcination conditions minimizes deterioration of the crystalline structure of the zeolite and provides a dehydrated zeolite that does not significantly rehydrate. US Pat. No. 6414071

It is also important to look at the claim as a whole and the import of this claims is that the claimed process works with ANY of the three types of zeolites. As the Examiner is no doubt aware, trial attorneys are creative and it could easily be envisioned that an argument at court could occur where a defendant would state that they are not infringing because they are using high ratio zeolites whereas the patentees had only low ratio zeolites. The Applicants respectfully assert that Claim 8 is presently allowable under 35 USC 112.

Claims 13 and 17 are rejected byt the Examiner due to the use of the term "such as." These claims have been amended to delete this term and are now in condition for allowance under 35 USC §112.

Claims 15 and 16 have rejected due to a lack of an antecedent basis for the terms "the crystallization time" and "the crystallization temperature." Both claims have been amended and are now in condition for allowance under 35 USC §112.

Claim 21 has been rejected as being an omnibus claim which is not allowed in US Patent practice. Claim 21 has been cancelled.

Claims 4-5, 9-11, 14, 18-20 were rejected by the Examiner as depending from Claims subject to rejection under 35 USC §112. In view of the amendments and arguments presented above, the Applicants respectfully assert that Claims 1-20, all of the remaining claims, are now in condition for allowance under 35 USC §112.

REJECTIONS UNDER 35 USC § 102

Claims 1-8, 10, 11, and 21 are rejected under 35 USC § 102(b) as being anticipated by Araya et al. (US 5,772,979).

Claims 1-11 and 21 are rejected under 35 USC § 102(b) as being anticipated by Kuhm et al. (US 5,645,811).

Rejection under 35 USC § 102 over Araya et al. (US Patent No. 5,772,979):

The Examiner has rejected Claims 1-8, 10, 11, and 21, as being anticipated by Araya et al. (US Patent No. 5,772, 979). The Examiner indicates that Araya et al discloses a method of making a zeolite in which a sodium aluminosilicate is allowed to crystallize for 45 minutes, sodium aluminate is added to the partially crystallized reaction mixture, and the resultant mixture was further crystallized.

Claims 1-8, 10, 11, and 21, are not anticipated by Araya et al. The first reason that these claims are not anticipated is that the process described in Araya et al. relates to a process of preparing zeolite of type "P" only. Molecular sieve zeolites selected from the group consisting of zeolite Y, X, A, ZSM-5, ZSM-11, Beta, Omega, clinoptilote and Mordenite only are capable of being prepared by adopting the process of the present invention (this limitation is present in claim 9). Thus, it can be noticed that the process described in Araya et al. is not intended to prepare the type of zeolites mentioned in the present application.

It is clearly provided in the entire description of Araya that sodium silicate, sodium aluminate and sodium hydroxide are mixed together to produce a first reaction gel and allowed to react so as to produce zeolite "P" seeds / nuclei in situ in the said first reaction gel. Araya clearly indicates that the sodium aluminate solution is added to the first reaction gel only after zeolite "P" seeds / nuclei are produced in the said first reaction gel and not prior to that. It follows then that that teachings of the cited prior art document are completely contradictory to the teachings of the present invention.

Also, as described in lines 10 to 15 of page 5 of the present application, seed of a "P" type zeolite is obtained only when the crystallized zeolite of the type mentioned in the present application i.e. zeolite Y or X or A or ZSM-5 or ZSM-11 or Beta or Omega or clinoptilote or Mordenite are not recovered by filtration from the mother liquor during their process of preparation and are allowed to stay. If the crystallized zeolite Y or X or A or ZSM-5 or ZSM-11 or Beta or Omega or clinoptilote or Mordenite are not recovered by filtration from the mother liquor, new crystalline phase such as quartz or P type zeolite start

growing in the silica rich mother liquor. Thus, according to Araya et al., the sodium aluminate solution is added only after zeolite Y or X or A or ZSM-5 or ZSM-11 or Beta or Omega or clinoptilote or Mordenite produced in the mother liquor has transformed to a new crystalline phase i.e. to "P" crystalline phase. It is respectfully submitted that the time at which the sodium aluminate solution is added in the present application is entirely different from the time period at which the sodium aluminate solution is added in Araya et al. In fact, it is respectfully submitted that by following the process of Araya et al., zeolite Y or X or A or ZSM-5 or ZSM-11 or Beta or Omega or clinoptilote or Mordenite cannot be obtained.

In view of these arguments, it is respectfully asserted that the process claimed in claim 1 of the present application is entirely different from the teachings of Araya et al and hence, Claim 1 and all claims pending from Claim 1 are in condition for allowance under 35 USC §102 in view of Araya et al.

With regard to claim 12, the process for enhancing the yield of molecular sieves during the synthesis from an aluminosilicate reaction mixture by making up for aluminium deficiency in the utilized reactants comprises the steps of:

- a) preparing a sodium aluminosilicate seed mixture;
- b) preparation a sodium aluminosilicate gel reaction mixture;
- c) adding the seed mixture of a) to the gel reaction mixture of b) and thus preparing molecular sieve precursor mixture;
- d) heating the molecular sieve precursor mixture to crystallization temperature;
- e) adding a source of aluminum to the molecular sieve precursor mixture at an intermediate stage of crystallization, wherein the molecular sieve precursor mixture is depleted of aluminum and enriched in soda and silica at the intermediate stage and the amount of source of aluminum added is so as to make up for the aluminum deficiency arising in the reaction mixture while crystallization; and
- f) crystallizing molecular sieve zeolite product, recovering the crystallized product by filtration; washing the same with hot demineralized water to obtain molecular sieve zeolite with pH below 9.

Essentially, the process of claim 12 consists of separate preparation of sodium aluminosilicate seed mixture and sodium aluminosilicate gel reaction mixture. Both of the above reactants are added together and then heated for the purpose of crystallization. During an intermediate stage of crystallization, a source of aluminum selected from sodium aluminate, aluminum oxalate, colloidal alumina or alumina gel is added. The quantity of the aluminum added is based upon balancing un-reacted alumina and silica present at the intermediate crystallization stage.

It follows that the present invention refers to the make up for the aluminum deficiency in un-utilized reactants at an intermediate stage of crystallization by addition of extra or additional alumina based on how much aluminum is deficient in the un-reacted system. This process effectively utilizes silica and enhances yield of crystallized product, otherwise a substantial part of the expensive raw materials would have been left unutilized resulting waste. In mature art areas, even small economic advantages can be important in Industrial applications. The economic advantages here are far from small.

The process of the present application is not specific to any one type of zeolite and is applicable to a variety of zeolite compositions. In Araya et al, it is stated that seeds of "P" type zeolite are produced in situ in first reaction gel consisting sodium aluminate and sodium silicate. Also, the cited art teaches:

- (a) reacting along with preheating gel mixture sufficient until zeolite P is formed,
- (b) adding sodium aluminate to the reaction gel when the crystallinity is below 25%, to produce second mixture ,
- (c) again reacting along with heating second reaction mixture to produce the resultant zeolite P.

Therefore it is clear that the teachings of claim 12 is entirely different from the teachings of Araya et al. More clearly, the present invention requires heating for once the whole mixture of sodium aluminosilicate gel reaction mixture and the sodium aluminosilicate seed mixture at a temperature range over an extended period of time for the purpose of crystallization whereas Araya et al teaches the preheating of first reaction gel mixture, followed by

addition of the first gel mixture onto a second reaction gel mixture and again heating it to obtain the final product. It can be clearly seen that the teachings of Araya et al., does not include:

- any indication for making up for aluminum deficiency arising in the reaction mixture while crystallization is in progress;
- any indication of addition of seed crystals,
- any indication that the process can be adopted to produce any other type of zeolite i.e. zeolites other than "P" type zeolite.

Thus, in view of the above, it is respectfully submitted that the process of the present application is completely different from the teachings of Araya et al., and a person of ordinary skill in the art would not consider the process of the present application as being the teachings of Araya et al. It is respectfully submitted that the objection under 35 USC §102 over Araya et al be withdrawn and Claims 1-20 be allowed.

Rejection under 35 USC §102 over Kuhm et al. (US Patent No. 5,646,811):

The Examiner has rejected claims 1-11 and 21 of the present application as being anticipated by Kuhm et al (US Patent No. 5, 645,811). The Applicants respectfully traverse these objections.

It is clear that the object of Kuhm et al. is completely different from the process of the present invention. Kuhm et al. clearly states that the object of their invention is to obtain finely ground molecular sieve zeolite. (Column 2, line 65 to Column 3, line 6). In contrast, the object of the present invention is to enhance the yield of the molecular sieve zeolite and not to obtain finely ground molecular sieve zeolite. **Thus, the object of the present invention is completely different from that of Kuhm et al.**

Kuhm et al. does not report that they have observed a substantial amount of enhancement in the yield of the molecular sieve zeolite because of addition of source of aluminum or the source of silicate. On the contrary, Kuhm et al., clearly admits that the effect of the addition of the source of aluminum to the reaction mixture during the

crystallization is reflected only in the small mean particle size of the crystalline zeolites obtained (Column 4, lines 51 to 56). Thus, Kuhm et al. expressly states that no other property of the crystalline zeolite is affected and that the yield is also not affected. In view of the above, it is respectfully submitted that a person of ordinary skill in the art, upon reviewing Kuhm et al. would not be in a position to envisage that the process described in Kuhm et al. would result in enhancement of the yield of the molecular sieve zeolite.

The process of the present invention as defined in the revised claim 1 and claim 12 is very different from that disclosed by Kuhm et al. For example, in Kuhm et al, the amount of source of aluminum or the source of silicate used at the time of starting of the process i.e. during the step of mixing of the reaction components with one another in step (a) need not be equal to the stoichiometric quantity required. It is admitted that the less than stoichiometric required quantity of the reaction components can be used at the time of mixing the reaction components with one another in step (a) and the balance amount may be added at the time of crystallization. In other words, in Kuhm et al, the reaction mixture obtained at the time of is mixing itself is stoichiometric deficient in at least one of the alkali metal silicate or the alkali metal aluminate. This is entirely contradictory to the teachings of the present invention. According to the present invention, it is mandatory to utilize stoichiometric required quantity of the reaction components at the time of mixing them together.

Another reason that the present invention is not anticipated by Kuhm et al, is that the amount of source of aluminum added by Kuhm et al. is not dependent upon the amount of aluminum deficiency arising in the reaction mixture at the time of crystallization. It is shown in Kuhm et al, at Example 5 that the amount of aluminum added to start with is less than the stoichiometric quantity required and the balance (the amount required to make the amount of aluminum equal to the stoichiometric quantity) is added during the crystallization step. In Example 6, a stoichiometric quantity of aluminum is added to start itself and thereafter at the time of crystallization step, aluminum in excess of the

stoichiometric quantity is added. Thus, in marked contrast to the present invention, it can be concluded that the amount of aluminum added in Kuhm et al is immaterial.

According to the revised Claim 1 of the present application, the amount of aluminum added is so as to make up for the aluminum deficiency arising in the reaction mixture during crystallization. This is a very important aspect of the present invention. The amount of aluminum added is strictly maintained so as to make up for the aluminum deficiency arising in the reaction mixture during crystallization. If an excess or insufficient amount of aluminum is added, the desired results, i.e. increase in the yield of the zeolite, is not observed.

The object of Kuhm et al., i.e. obtaining finely ground molecular sieve zeolite, has been showed to have been achieved by an even addition of silicate at the time of crystallization. This particular teaching is completely against the teachings of the present invention. In the present invention, only the source of aluminum should be added and the source of silicate should not be added at the intermediate stage of the crystallization. If a silicate source is added, it adversely affects the entire process and the quantity as well as the quality of the molecular sieve zeolite obtained is drastically affected.

Lastly, by practicing the process of the present invention, molecular sieve zeolites selected from the group consisting of zeolite Y, X, A, ZSM-5, ZSM-11, Beta, Omega, clinoptilolite and Mordenite can be prepared. On the other hand, by adopting the process of Kuhm et al. only type A, type P and Faujasite type zeolites can be obtained. Hence, all the limitations of the present invention are not available in the teachings of the Kuhm et al.

Thus, in view of the above, it is respectfully submitted that the process of the present application is drastically different from the teachings of Kuhm et al., and a person of ordinary skill in the art would not consider the process of the present application as being anticipated or as being obvious in view of the teachings of Kuhm et al. The Examiner is respectfully requested to withdraw the rejections of the claims.

REJECTIONS UNDER 35 USC § 103

Claims 12-21 are rejected under 35 USC § 103(a) as being unpatentable over Kuhm et al. (US 5,645,811 in view of Dwyer et al. (US 4,818,509).

The Examiner indicates that claims 12 to 21 of the present invention are unpatentable over Kuhm et al. in view of Dwyer et al. The Applicants respectfully traverse this objection as follows.

As mentioned above, the object of Kuhm et al. is completely different from the process of the present invention. Kuhm et al. clearly states that the object of their invention is to obtain finely ground molecular sieve zeolite. Similarly the object of Dwyer et al. is also to provide a continuous process for manufacturing wide variety of zeolites having selected crystal size. One of the objects of the present invention is to increase the yield of zeolites. Thus, it may be said that although the objects of Kuhm et al and Dwyer et al. are overlapping, it is clear that they are completely different from the objects of the present invention.

The Examiner indicates that the aspect of enhancing the yield of the zeolites in the present invention has been anticipated by Kuhm et al, which teaches about depletion and subsequent enrichment of the reaction mixture (column 4, lines 46-68). However, in column 4, lines 51-56, Kuhm et al. clearly teaches that the effect of the addition of the source of aluminum to the reaction mixture during the crystallization is reflected only in the small mean particle size of the crystalline zeolites obtained. Thus, Kuhm et al. "admits" that no other property of the crystalline zeolite is affected and that the yield is also not affected.

Regarding the Examiner's position that Kuhm et al. teaches depletion and subsequent enrichment of the reaction mixture, the Applicants respectfully submit that the terms "depletion" and "enrichment" are used in a completely different sense. According to Kuhm et al., the amount of source of aluminum or the source of silicate used at the time of

starting of the process, i.e. during the step of mixing of the reaction components with one another in step (a), need not be equal to the stoichiometric quantity required. Thus, if less than stoichiometric required quantity of the reaction components is used at the time of mixing the reaction components with one another in step (a), the reaction mixture is termed as depleted or other wise deficient. In column 4, lines 41 to 68 Kuhm et al indicates that at the time of crystallization the balance amount may be added to such a stoichiometrically deficient reaction mixture. This is entirely contradictory to the teachings of the present invention. According to the present invention, it is mandatory to utilize stoichiometric required quantity of the reaction components at the time of mixing them together. Thereafter, as the reaction mixture becomes depleted of aluminum at an intermediate stage, a source of aluminum only is added to increase yields.

In the other alternative which is taught by Kuhm et al., i.e. enrichment of the reaction mixture, the amount of source of aluminum added by Kuhm et al. is not dependent upon the amount of aluminum deficiency arising in the reaction mixture. In example 6, a stoichiometric quantity of aluminum is added at the start and thereafter at the time of crystallization, varying quantity of aluminum in excess of the stoichiometric quantity is added. Thus, it can be noticed that the amount of aluminum added does not play a vital role. However, according to the present invention, the reaction mixture becomes aluminum deficient and the amount of aluminum added is so as to make up for the amount of aluminum deficiency arising in the reaction mixture and is not in excess of the deficient amount. Thus, the teachings of the present invention are completely different from the teachings of Kuhm et al.

The teaching of the second embodiment of Kuhm et al. (i.e. addition of aluminum or silicate in excess of the stoichiometric quantity at the time of crystallization) is completely different from the teachings of the present invention. The product obtained by following the process described in example 1 of Kuhm et al., has the stoichiometric ratio of the components as $4.2 \text{ Na}_2\text{O} : \text{Al}_2\text{O}_3 : 2 \text{ SiO}_2 : 100 \text{ H}_2\text{O}$ (Column 9, line 11). Thus, the product having the desired stoichiometric ratio of the components is obtained only when

necessary stoichiometric quantity of the components are added, irrespective of the fact whether the necessary stoichiometric quantity of the components are added at the starting of the reaction or at an intermediate stage. The quantity of the components added play a critical role in determining the stoichiometric ratio of the components in the final product and not the time period at which they are added.

However, as can be noticed from example 2, if silicate is added in excess of the required stoichiometric ratio of the components (the excess silicate being added at the time of crystallization), the stoichiometric ratio of the components in the final product deviates from the desired value. In example 2, Kuhm et al., clearly admits that due to the addition of an excess amount of silicate, the stoichiometric ratio of Al_2O_3 : SiO_2 was less than 1:2 (1:2 being the desired value). Thus, the product obtained by following the process defined in example 1 is entirely different from the product obtained by following the process defined in example 2.

In the similar manner, if we compare example 5 and 6, we will notice that when a stoichiometric quantity of Al_2O_3 is added (as shown in example 5), the product obtained has the stoichiometric ratio of the components as 4.2 Na_2O : Al_2O_3 : 2 SiO_2 : 100 H_2O (refer to column 12, lines 54 and 55). This is once again irrespective of the fact that deficient amount of aluminum is added at the time of crystallization. However, as can be noticed from example 6, if aluminum is added in excess of the required stoichiometric ratio of the components (the excess aluminum being added at the time of crystallization), the stoichiometric ratio of the components in the final product deviates from the desired value. In example 6, Kuhm et al., clearly admits that due to addition of excess amount of aluminum, the stoichiometric ratio of Al_2O_3 : SiO_2 was greater than 1:2 (1:2 being the desired value). Thus, the product obtained by following the process defined in example 5 is entirely different from the product obtained by following the process defined in example 6.

It follows then that the excess amount of silicate added in example 2 as well as the excess amount of aluminum added in example 6 will not result in enhancement of the yield

of the desired product (i.e. a product having stoichiometric ratio of the components as 4.2 Na₂O : Al₂O₃ : 2 SiO₂ : 100 H₂O). Rather, it will decrease the yield of the product having stoichiometric ratio of the components as 4.2 Na₂O : Al₂O₃ : 2 SiO₂ : 100 H₂O.

In contrast, in practicing the process of the present invention, the stoichiometric ratio of the components in the final product is not affected by the addition of the source of aluminum. The excess amount of aluminum added results in the enhancement of the yield and does not affect the molar ratio of Al in the end product zeolite. Thus, it is respectfully submitted that the teachings of the present invention is completely contradictory to the teachings of Kuhm et al.

The fact that Dwyer et al. teaches the use of seeds in the initial reaction mixture or that it discloses washing of the zeolite at a pH of less than 9 does not make the present invention non-patentable over the combination because the all the limitations of the present invention and especially the limitation that the amount of aluminum added is so as to make up for the amount of aluminum deficiency arising in the reaction mixture is not being taught by the documents. It is evident that in Dwyer et al, seeding was done solely for the purpose of optimization of the particle size, implying product quality and not for the enhancement in quantitative yield which is the objective in the present invention. Similarly, and also in marked contrast to the present invention, the Kuhm et al the invention was made to have mixed seeds with the gel to obtain desired crystal size during crystallization stage.

Clearly, neither Dwyer et al nor Kuham et al teach adding additional aluminum at an intermediate stage of the crystallization. It follows then that one of ordinary skill in the art would not have been motivated to even experiment with such an addition by either of the cited references.

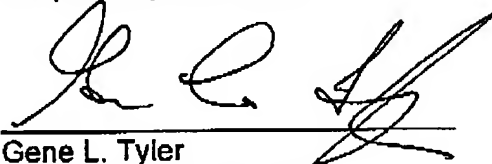
Thus, the Applicants respectfully submit that none of the documents cited by the Examiner either taken independently or in combination teach or suggest all the limitations

of the presently claimed invention. In view of the above, it is the Applicants' position that the claims of the present invention are not obvious in view of the Examiner's references.

CONCLUSION

For all the foregoing reasons, Applicant submits that the application is in a condition for allowance. No fee is believed due for this paper. The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. **13-0010 (KSP-1002US)**.

Respectfully submitted,



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CERTIFICATE OF FACSIMILE TRANSMISSION

I do hereby certify that this correspondence is being transmitted via facsimile, to the Commissioner for Patents, Examiner David R. Sample, facsimile no. (703) 872-9306, on this 20th day of September, 2005.



Gene L. Tyler